

SCHIZOPOD CRUSTACEANS IN THE U. S. NATIONAL MUSEUM: SCHIZOPODS FROM ALASKA.^a

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The present paper treats of a collection of Schizopods made during the investigations by the Alaska Salmon Commission in 1903. The collection, although small, contains a number of interesting forms. One of them represents a new genus the systematic position of which was ascertained with difficulty, and to which finally a position could be assigned only by altering the definition of one of the established subfamilies of the family Mysidæ.

The paper was originally to be published by the Bureau of Fisheries, but was turned over to the U. S. National Museum, and it forms here the second instalment of a series of publications intended to describe the Schizopods of the national collections.

Order MYSIDACEA Boas.

Family LOPHOGASTRIDÆ G. O. Sars.

Genus GNATHOPHAUSIA Willemoes-Suhm.

GNATHOPHAUSIA GIGAS Willemoes-Suhm.

G. O. SARS, Rep. Voy. Challenger, XIII, 1885, p. 33, pl. III.—ORTMANN, Bull. U. S. Fish Comm. for 1903, 1905, p. 968; Proc. U. S. Nat. Mus., XXXI, 1906, p. 36, pl. II, figs. 1a, 1b.

Station No. 4267.—1 male (?), juv.—Off Sitka Sound, 922 fathoms. (Color, dark crimson).

Previous records.—Atlantic: West of Azores, 2,200 fathoms (*Challenger*); between Cape Charles and Long Island, 852 fathoms (*Albatross*); Pacific: Hawaiian Islands, 856–767 fathoms; Bering Sea, 399 fathoms; between Unalaska and Kadiak, 695 fathoms; between Sitka and Columbia River, 876 fathoms (*Albatross*).

^a For first paper see Proc. U. S. Nat. Mus., XXXI, 1906, pp. 23–54.

The present specimen agrees well with the one mentioned by the writer among the Hawaiian Schizopods. Its length (difficult to measure, since the specimen is doubled up) is about 55 mm. It differs from the typical (adult) *Gnathophausia gigas* in the stronger development of the branchiostegal, infero-lateral, and postero-dorsal spines; the branchiostegal spines are even stronger than in the Hawaiian specimen. Besides, the supraocular is distinctly larger than the antennal. The outer margin of the antennal scale has five distinct teeth, while the type has only four, and the Hawaiian specimen has also four, of which the last one is very small. The rostrum is longer than in the Hawaiian individual; in the present specimen the part in front of the ocular spines is distinctly longer than the rest of the carapace, including the posterior spine, while in the one from Hawaii it is about as long as the rest of the carapace without the posterior spine. All these minor differences apparently are due to age.

Family MYSIDÆ Dana.

Subfamily LEPTOMYSINÆ Norman, 1892.

The division of the family Mysidæ into subfamilies seems quite necessary on account of the large number of genera of very various type contained in it. The subfamilies created by Norman^a are chiefly framed with reference to the British forms, and thus it is sometimes hard to assign foreign genera and species to their proper place.

According to Norman,^a the following features are characteristic for this subfamily:

Outer uropods one-jointed, their outer margin setose. Gnathopods (= second maxillipeds or second cormopods) conforming in general character of the endopodite to the maxillipeds (= first maxillipeds or first cormopods). First true legs (= third cormopods) similar to the following in general character, and not very greatly developed and larger than the latter. Male with all pleopods greatly developed and adapted for swimming, second to fifth pair biramous, all branches multiarticulate and setose, the outer branch of fourth, and sometimes also of third modified for sexual purposes, but the modification only extending to a slight lengthening of the limb and a change in the character of the setæ of the terminal joints.

This diagnosis does not exactly apply to some forms, not treated by Norman, which clearly ought to be placed here, while it apparently fits others, which are more widely different in other characters.

Boreomysis G. O. Sars,^b for instance, although answering fairly well to the above diagnosis, differs at once in the presence of seven

^a Ann. Nat. Hist. (6), X, 1892, p. 147.

^b Monogr. Mysid., III, 1879, p. 8.

pairs of marsupial lamellae, and should be placed in a distinct subfamily.

The genera *Amblyops* G. O. Sars^a and *Pseudomma* G. O. Sars^b probably belong in this subfamily, but differ from all other genera in the rudimentary condition of the eyes, which are lamelliform. The male pleopods are here very uniform in shape, the first with the inner branch rudimentary, the four others with subequal branches. The telson resembles rather that of the typical *Leptomysinae*, being not cleft.

The genera *Erythrops*, *Parerythrops*, and *Euchatomera* seem to form a natural group, differing from the typical *Leptomysinae* in the shape of the telson, which always is remarkably short, and mostly has no lateral spines. In this group the male pleopods, as in the *Amblyops* group, are also very uniform, the second to fifth having subequal branches.

Of the other genera, *Leptomysis*, *Mysidopsis*, *Mysideis*, and the new genus *Holmesiella* described herein, again form a natural group, characterized by a peculiar development of the male pleopods, which are not so uniform as in the genera mentioned above; in the fourth pair one of the branches develops the tendency to become longer than the other, bearing at the same time a peculiar armature at the apex. The telson in all these forms is distinctly longer than in the *Erythrops* group, and invariably possesses marginal spines. This group, which may be called the typical one of the *Leptomysinae*, since it conforms best to the original diagnosis of the subfamily, forms a transition to the subfamily *Mysinae*; in fact, the latter differs only in a greater accentuation of the differentiation of the male pleopods, not only the first pair, but also the second, and generally also the fifth showing distinct reductions, bearing only one ramus as in the female. Sometimes this reduction even affects the third pair. The difference of the two branches of the fourth pair has become very strongly pronounced in the *Mysinae*, one branch being rudimentary, the other greatly developed.

The genus *Callomysis* Holmes^c differs from all other genera in the subfamily *Leptomysinae* in the shape of the pleopods of both, male and female. Here, according to Holmes' account, the pleopods of the female are rudimentary, but biramous, while they are uniramous in all other genera; and also the male pleopods are small and rudimentary, although all distinctly biramous; and further, differing from all other genera, here it is the *third* pair in the male, in which the outer ramus is elongated, much after the style in certain *Mysinae*.

^a Monogr. Mysid., II, 1872, p. 3.

^b Idem, I, 1870, p. 48.

^c Proc. Cal. Acad. Sci. (2), IV, 1895, p. 582.

If we want to include *Callomysis* as well as the *Amblyops* and *Erythrops* groups into this subfamily, we are to alter slightly the above diagnosis of the Leptomysinae as given by Norman, and put it the following way:

Subfamily: Leptomysinae.

Outer uropods one-jointed, their outer margin setose. Gnathopods (second cormopods) conforming in general character of the endopodite to the maxillipeds (first cormopods). First true legs (third cormopods) similar to the following in general character, and not very greatly developed and longer than the latter. Male with all the pleopods well developed, and adapted for swimming; second to fifth pair biramose, and never resembling those of the female. Sometimes one of the branches of the fourth (rarely the third) pair modified for sexual purposes, in being slightly lengthened and possessing peculiar setae on the terminal joints.

The following key of the genera of Leptomysinae mentioned above may be convenient for their identification. No complete revision of the subfamily is intended.

KEY TO GENERA.

- a*¹. Eyes rudimentary, lamelliform. Male pleopods very uniform, the first with inner branch rudimentary, the second to fifth with two subequal branches.
Amblyops Sars and *Pseudomma* Sars.
- a*². Eyes not lamelliform, more or less globular.
- b*¹. Telson short, sometimes hardly longer than wide, always much less than twice as long as wide. Outer margin not spinous (or rarely so, in *Euchatomera*). Apex not cleft. Male pleopods very uniform, the second to fifth with two subequal branches.
Erythrops Sars,^a *Parerythrops* Sars,^b *Euchatomera* Sars.^c
- b*². Telson longer, generally at least twice as long as wide. Outer margin always spinous. Apex entire or cleft. Male pleopods less uniform; one branch of third or fourth pair generally longer than the other (the prolongation sometimes only caused by the presence of a terminal spine).
- c*¹. Pleopods of female rudimentary, simple. Outer or inner branch of fourth pleopods of male with tendency to become lengthened.
- d*¹. Outer margin of antennal scale setose, without distal spine. Outer branch of fourth pleopods of male with tendency to become lengthened, its terminal joints only slowly increasing in length, if at all.
- c*². Telson elongated, linguiform, apex pointed or rounded, not cleft. Three last joints of outer branch of fourth pleopods of male without setae, but with three strong spines. Antennal scale very long, narrow, pointed.-----*Leptomysis* Sars.^d

^a Sars, Monogr. Mysid., I, 1870, p. 11; Norman, in Ann. Nat. Hist. (6), X, 1892, p. 159.

^b Sars, Idem, p. 40.

^c Sars, Rep. Voy. Challenger, XIII, 1885, p. 211.

^d Sars, Monogr. Mysid., III, 1879, p. 29; Norman, Ann. Nat. Hist. (6), X, 1892, p. 242.

- e*². Telson more or less triangular, apex truncate or cleft. Terminal joint of outer branch of fourth pleopod of male with a single stout terminal spine. Antennal scale lanceolate or ovate.
- f*¹. Outer branch of fourth pleopod of male projecting only with the terminal spine beyond inner branch; distal joints not at all increasing in length. Telson triangular, apex truncate or cleft.
Mysidopsis Sars.^a
- f*². Outer branch of fourth pleopod of male distinctly projecting beyond the inner, distal joints slowly increasing in length. Telson triangular, apex with a short cleft-----*Mysideis* Sars.^b
- d*². Outer margin of antennal scale not setose, ending in a spine near the distal end. Terminal joints of *inner* branch of fourth pleopod of male increasing in length, especially the last one greatly elongate, and bearing a spine at its end. Telson elongated-triangular, apex truncate, not cleft-----*Holmesicella*, new genus.
- e*². Pleopods of female biramous, although rudimentary. Outer branch of third pleopod of male much elongated. Outer margin of antennal scale not setose, with terminal spine. Telson subrectangular, 2-3 times as long as wide, outer margin spinous, spines remote proximally, but more close set distally; apex slightly emarginated, emargination spinous.
Callomysis Holmes.^c

Genus HOLMESIELLA Ortmann, new genus.^d

Diagnosis.—A genus of Mysidae, belonging to the subfamily Lep-tomyssinae. Body of the usual form. Eyes large. Third joint of peduncle of antennulae in the male with a strong conical process on the lower side of the distal extremity. Legs slightly setose, with the propodite triarticulate, dactylopodite short, with a long, curved, terminal spine. Marsupial pouch of female consisting of three pairs of leaflets, the anterior small. Pleopods of female all rudimentary, short and simple. Pleopods of the male all biramous, but in the first pair the inner branch is short and simple; in the second, third, and fifth pair both branches are well developed, of about the same length, and multiarticulate; in the fourth pair it is the *inner* branch that is much elongated, about twice as long as the outer. The terminal joints increase in length, and especially the last one is much elongated, almost three times as long as the penultimate, and carries at the distal extremity a long and strong spine. The three last joints do not possess any setae. Telson elongated, triangular, apex truncated, margins spinulose. Uropods narrow; otolithe well developed.

^a Sars, Monogr. Mysid., II, 1872, p. 12; Norman, Ann. Nat. Hist. (6), X, 1892, p. 163.

^b Sars, Idem, III, 1879, p. 1.

^c Holmes, Proc. California Acad. Sci. (2), IV, 1895, p. 582.

^d Named in honor of Prof. S. J. Holmes, in recognition of his work on Pacific Crustaceans.

The chief character of this genus is furnished by the development of the fourth pair of pleopods of the male (Plate I, fig. 11). Here it is the *inner* ramus (i. e., the one that carries a lobe-like process at the base) which is elongated beyond the outer one, while in all other genera with a tendency to increase the length of a branch of this appendage, it is always the *outer* branch that surpasses the inner. In shape, this elongated inner branch resembles to a degree that of the outer branch of *Mysidopsis* and *Mysideis*, being somewhat an exaggeration of the structure found in these two genera.

In the form of the antennal scale (Plate I, fig. 2) *Holmesicella* differs from all related genera (*Leptomysis*, *Mysidopsis*, *Mysideis*), and rather recalls *Callomysis*, or the genera of the *Erythrops* group. The shape of the telson does not differ much from the types known among the typical group of the Leptomysinae. In all other respects, it possesses nothing that varies considerably from the characters assigned to the subfamily Leptomysinae.

Type of the genus.—*Holmesicella anomala*.

HOLMESIELLA ANOMALA Ortmann, new species.

Plate I, figs. 1-13.

Station No. 4192.—12 young (male and female) (cotypes).—Gulf of Georgia, off Nanaimo, Vancouver Island, 89-97 fathoms.

Station No. 4251.—5 female adults (cotypes).—Stephens Passage, south of Juneau, 198 fathoms.

Station No. 4257.—1 male adult, type Cat. No. 31494, U.S.N.M.—Vicinity of Funter Bay, Lynn Canal (north of Juneau), 350 fathoms (estimated).

Station No. 4264.—2 female adults, cotypes Cat. No. 31492, U.S.N.M.—Off Freshwater Bay, Chatham Strait, south of Juneau, 293-282 fathoms.

Description of adult male.—Total length of largest specimen (type, from Station No. 4257), 37 mm. Body slender, but strong. *Carapace* with the frontal part projecting, not pointed, but broadly rounded. *Eyes* comparatively large, cornea globular, dark brown. *Antennula* (Plate I, fig. 1).—Projecting beyond the eyes with the terminal joint of the peduncle; first joint subcylindrical, second joint very short, terminal joint swollen, thicker than the two preceding ones, about as long as thick, with the usual conical process at the distal end on the under side.

Antenna (Plate I, fig. 2).—With the peduncle shorter than that of the antennulae. Antennal scale large, projecting far beyond the peduncle of the antennulae, lanceolate, margins almost parallel in the middle part; outer margin almost straight, without setae, terminating in a strong spine a short distance from the tip. Tip and inner margin setose.

True legs (Plate I, fig. 8) slender, sparsely setose. Propodite three-jointed; dactylopodite short, with a long curved terminal spine.

Abdomen long and slender. Abdominal appendages greatly differentiated, but all biramous. *First pair* of pleopods (Plate I, fig. 9) with outer branch well developed and multiarticulate; inner branch short, about half as long as outer, uniarticulate, with a blunt process near base. *Second and third pair* (Plate I, fig. 10) with both branches nearly alike and multiarticulate, the inner one hardly longer than the outer, bearing a blunt process at the base. *Fourth pair* of pleopods (Plate I, fig. 11) with outer branches similar to that of the first, second, and third pair, but inner branch (bearing a blunt process at base) much elongated, about twice as long as outer. This is due chiefly to the lengthening of the three distal joints, of which the first two increase only slightly, while the last one is considerably longer than these two together. All three terminal joints are destitute of setae, but the last one bears at its end a long and stout spine. The *fifth pair* of pleopods is similar to the second and third.

In *young males* the *pleopods* are not so strongly developed; in the second, third, and fifth the inner branch is distinctly longer than the outer (two or three joints projecting beyond the tip of the outer), and the inner branch of the fourth is not so greatly elongated, although the remarkable increase in length of the distal joints is distinctly indicated.

Uropods (Plate I, fig. 13) well developed, with well developed otolithe; both branches longer than the telson, but the outer one much longer than the inner. Margins setose, inner margin of the inner branch with a row of seven spines near the otolithe, of which the distal one is remote from the rest.

Telson (Plate I, fig. 13) elongate-triangular; margins straight, with 16-18 spines along the greater distal part of the margins; the spines increase slowly toward the end, the last one on each side being twice as long as the one preceding it. Between the two long spines forming the outer corners of the telson the apex is truncated and carries 4 spines, the two outer ones short and stout, the inner ones very long and setiform.

The largest *female* represented in the collection (Station No. 4264) measures 40 mm. The conical process of the antennulae is lacking in the female. The *marsupium* consists of three pairs of leaflets, of which the first pair is quite small. The *pleopods* (Plate I, fig. 12) are all uniform, being simple and of the usual shape in the family, increasing slightly in length from the first to the last.

Subfamily MYSINÆ Norman.^a

Diagnosis.—Outer uropods one-jointed, their outer margin setose. Gnathopods (2. Cormopods) conforming in general character of endopodite to the maxillipeds (1. Cormopods). First true legs (3. Cormopods) similar to the following in general character. Male with first, second, and fifth (exception, *Hemimysis*) pleopods as in female; the third consists of a basal joint and two branches, rarely it is also simple; the fourth consists of a basal joint and two branches, the inner minute, the outer styliform and generally of great length.

Genera.—*Hemimysis* Sars; *Diamysis* Czerniavsky; *Neomysis* Czerniavsky; *Macropsis* Sars; *Mysis* Latreille; *Schistomysis* Norman; *Macromysis* A. White.

Genus NEOMYSIS Czerniavsky 1882.^b

Diagnosis (according to Norman).—Antennal scale subulate, very long and narrow, six to ten times as long as broad (running out into an acute, spine-like termination), ciliated on both margins. Labrum acutely pointed in front. Legs with multiarticulate tarsus (propodite), posterior pairs more strongly built than the anterior, and with more articulations in tarsus. Telson subtriangular, elongated, apex entire, pointed, margins spined (the spines subequal, no smaller spines alternating with larger ^c). In the male the third as well as the first, second, and fifth pleopods are simple, and resemble the same organs in female; fourth pleopod with a short peduncle, not much longer than broad, inner branch as usual in Mysinae, outer branch consisting of only two articulations, the first very long, the second rather short; from its end spring two subequal, spiniform, ciliated filaments of no great length.

Type.—*Mysis vulgaris* J. V. Thompson.

NEOMYSIS KADIAKENSIS Ortmann, new species.

Station No. 4272.—1 male, 2 females.—Afognak Bay, Afognak Island, Kadiak Group, 17 to 12 fathoms.

Body slender; total length of largest individual (female), 21 mm.

Frontal margin slightly produced, bluntly triangular (corresponding closely to that of *N. vulgaris*, as figured by Sars.^d) *Eyes*, *antennulae*, and *antennae* similar to those of *N. vulgaris*, but *antennal scale* more slender, 13–14 times as long as wide (9–10 times as long as

^a Norman, Ann. Nat. Hist. (6), X, 1892, p. 147.

^b Norman, Idem, p. 261.

^c This sentence is to be dropped on account of *Neomysis americana* (Smith).

^d Monogr. Mysid., III, 1879, pl. xxxiv, fig. 1.

wide in *N. vulgaris*). *Propodites* of legs with 9 to 12 joints, i. e., the third cormopod (first true leg) has 9 joints, the fourth and fifth have 11 joints, the sixth, seventh, and eighth have 12 joints; for the rest, the true legs resemble those of *N. vulgaris*. *Telson* elongate-triangular, about three times as long as broad at the base, margins with 20 to 23 spines, occupying a little more than the distal two-thirds of the margin, the proximal part being unarmed. These spines are rather uniform in size, increasing slightly and uniformly toward the tip, being very crowded near the tip, while near the proximal part of the margin they are slightly more distant from each other. Spines at the corners of the narrowly truncated apex resembling the adjacent marginal spines; between them are two small spines. *Uropods* as in *N. vulgaris*. *Pleopods of male* resembling closely those of *N. vulgaris*, but the distal joint of outer branch of the fourth is about half as long as the proximal, and a little longer than the terminal filaments.

Type.—Cat. No. 31493, U.S.N.M.

This species is closely allied to *Neomysis vulgaris* (Thompson) of North Europe,^a but differs in the more slender antennal scale, the number of joints of the propodites of the true legs, the relative length of the two joints of the outer branch of the fourth pleopods of the male, and in the shape and armature of the telson. *N. vulgaris* attains a length of 17 mm.

Neomysis americana (Smith) from the northeastern coast of North America,^b is distinguished by the evenly rounded rostrum the antennal scale, which resembles that of *N. vulgaris*, the fourth pair of pleopods of the male, in which the first joint of the outer ramus is 4 to 5 times as long as the second, while the latter is little more than half as long as the terminal filaments, and by the telson, which resembles in shape that of *N. vulgaris*, and has unequal marginal spines, with several smaller ones in the intervals of the larger. Size, 14 mm.

Another species belonging to this genus is *Neomysis rayi* (Murdoch), from Point Barrow, Alaska,^c but this species is much larger (up to 65 mm.), the rostral projection is quadrangular with rounded corners, the propodites of the true legs have 8 to 9 joints. The telson resembles that of *N. vulgaris*, but the account of it given by Murdoch is not full enough to make an exact comparison.

^a Sars. Monogr. Mysid., III, 1879, p. 80, pl. xxxiv; Norman, Ann. Nat. Hist. (6), X, 1892, p. 261.

^b Rep. U. S. Fish Comm., I, 1873, p. 552, and Trans. Conn. Acad., V, 1879, p. 106.

^c Proc. U. S. Nat. Mus., VII, 1884, p. 519, and Rep. Pol. Exp. Point Barrow, 1885, p. 141 pl. 1, fig. 3.

Neomysis awatchensis (Brandt), from Avacha Bay, Kamchatka,^a is rather incompletely known. It is said to be of an entirely black color, and to resemble *N. vulgaris*, with the exception of a shorter antennal scale and a "truncated and four spined telson." This latter character, however, does not seem to differ from *N. vulgaris*.

EXPLANATION OF PLATE I.

(All figures are considerably enlarged.)

Holmesiella auomala, new genus and new species.

Fig. 1. Antennula of young male from Station No. 4192.

2. Antenna of adult female.
3. Mandible of adult female.
4. First maxilla of adult female.
5. Second maxilla of adult female.
6. First cormopod (first maxilliped) of adult female.
7. Second cormopod (second maxilliped) of adult female.
8. Fourth cormopod (second true leg) of adult female.
9. First pleopod of adult male.
10. Third pleopod of adult male.
11. Fourth pleopod of adult male.
12. Fourth pleopod of adult female.
13. Telson and uropods of adult female.

^a Brandt, *Krebse*, in *Middendorff's Sibirische Reise*, 11, Pt. 1, 1851, p. 126.